Soil and Ash pH Concentrations

by Ali, Celine and Francesca

Background on Ash

- "Scientists have found that ash particles in the streams can shred the fish's gills and drive up the water's alkalinity, possibly affecting reproduction and setting the stage for die-offs" (NY Times).

- Ash in meadow contaminated by fire retardants

    - chemicals sometimes letting out dioxins / furans

    - harming future generation of wildlife

Ash Makeup

Combustion of wood ash:

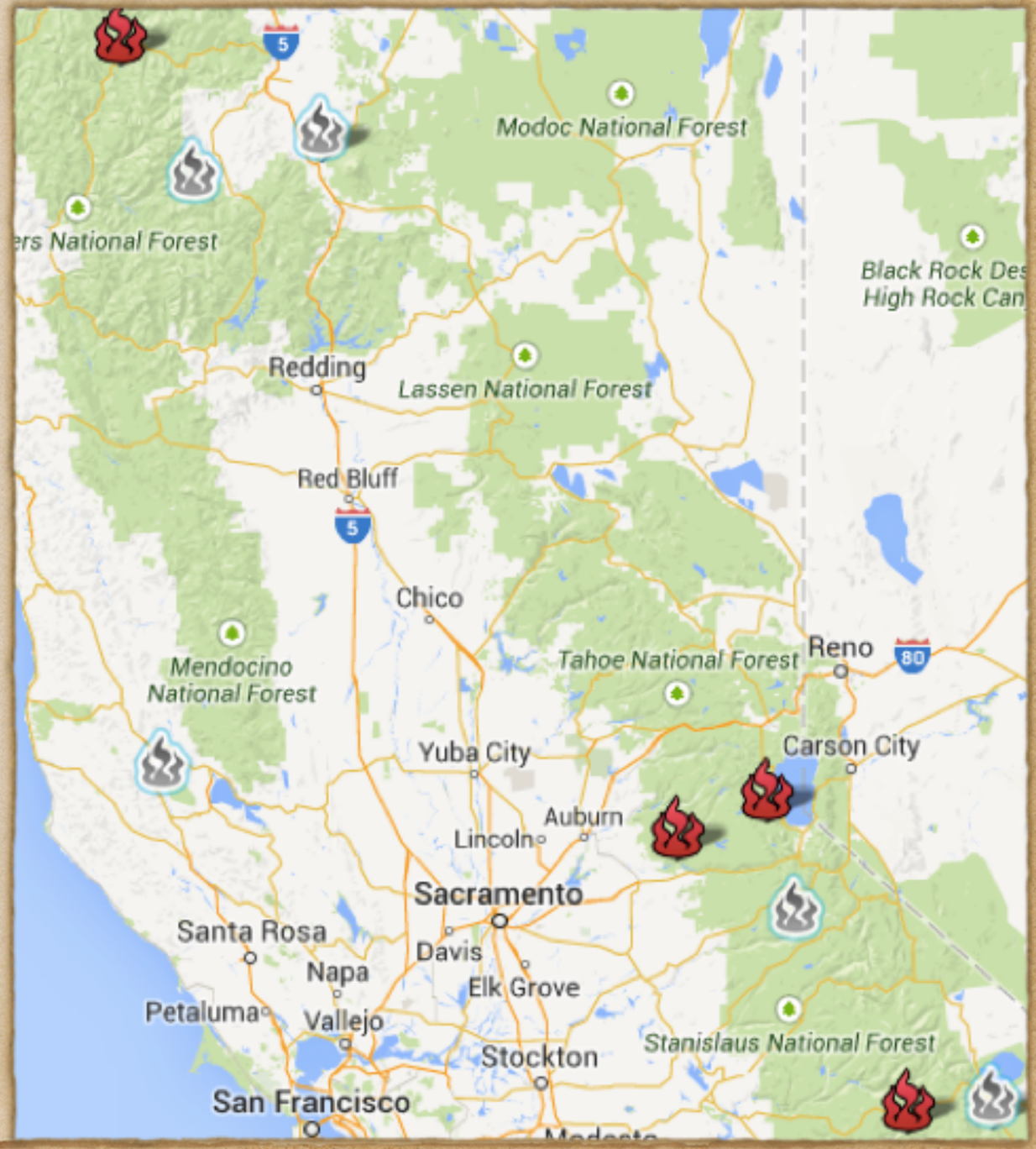
- Mostly carbon
- Calcium carbonate (in the white, not black)
- Calcium oxide
- Iron oxide
- Sodium, Potassium, Calcium, trace minerals

Background on Van Norden Meadow

- Largest level area in the Donner Summit Area which makes it very easy for ash to be blown in and for ash to settle
- Used to be a lake
- Second largest sub-alpine wetland in the Northern Sierra

King Fire

- Started Sept 13
- Started by an arsonist in El Dorado County
- Has burned 100,000 acres
- Now 72% contained



Main Question

How much ash will it take to change the pH of the soil and will it become more basic or acidic?

Materials

- Soil from meadow
- Ash from meadow
- Distilled water
- Scale
- pH test kit

Procedure

Part 1: In the Field

1. Collect carbon (ash) remnants from meadow

2. Collect soil sample from 1 area in meadow

Procedure
Part 2: In the Lab-rary

1. Measure 0.5 grams of soil
2. Measure varying amounts of ash (to make desired ratio with soil)
3. Mix ash and soil
4. Add to pH test kit
5. Add pH pill, water, and shake
6. Compare color of test to pH chart
7. Repeat 8 times varying the amount of ash
8. Record data

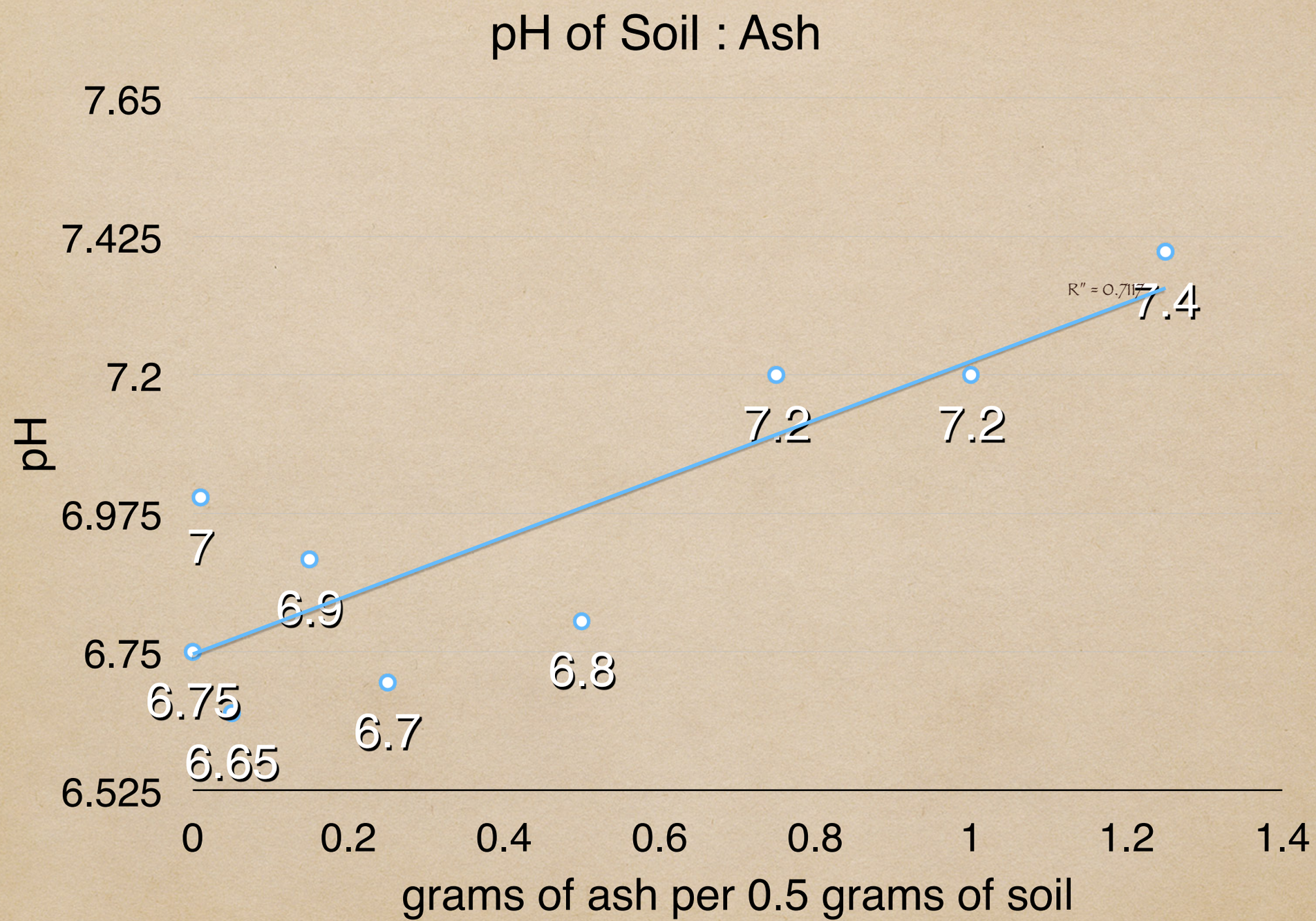
Hypothesis

. The soil will become more basic with the increasing amounts of ash

. It will take 5 grams of ash per 12 grams of soil

pH of Soil : Ash

g soil: ash	pH
0.5: 0	6.75
0.5 : 0.01	7.0
0.5 : 0.05	6.65
0.5 : 0.15	6.9
0.5 : 0.25	6.7
0.5 : 0.5	6.8
0.5 : 0.75	7.2
0.5 : 1:0	7.2
0.5 : 1.25	7.4


pH of Soil : Ash
7.65
7.425
7.2
6.975
6.75
6.525
pH
R² = 0.7117
7.4
7.2
7.2
7
6.9
6.8
6.75
6.7
6.65
0
0.2
0.4
0.6
0.8
1
1.2
1.4
grams of ash per 0.5 grams of soil

Conclusion

- It takes 0.01 grams of ash to change the pH of 0.5 grams of soil
- for every 1,000 grams of soil, 20 grams of ash will change it's pH to make it more basic
- As we increase the amount of ash, the pH of the soil becomes more basic (increases)
    - experimental error
- Soil in meadow most likely more basic than last year because of ash

What Could We Do Better?

- Be more precise in pouring the soil into the pH test
- Breaking the capsule more carefully
- Taking soil from different areas in the meadow

Relations

- Group who tested ash concentrations in water
    - the more ash added, the more basic the water became

Bibliography

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